

REMARKS

Claims 1-11 and 13-31 are now present in the application. Claims 1, 22, 30 and 31 are independent claims. Claims 1, 22, 30 and 31 have been amended. Reconsideration of this application, as amended, is respectfully requested.

Reasons for Entry of Amendments

At the outset, it is respectfully requested that this Amendment be entered into the Official File in view of the fact that the arguments presented automatically place the application in condition for allowance.

In the alternative, if the Examiner does not agree that this application is in condition for allowance, it is respectfully requested that this Amendment be entered for the purpose of appeal. This Amendment reduces the issues on appeal by clarifying distinctions between the applied references and the Applicant's claimed invention. This Amendment was not presented at an earlier date in view of the fact that Applicant did not fully appreciate the Examiner's position until the Final Office Action was reviewed.

Rejections Under 35 U.S.C. § 103

Claims 1, 2, 5-9, 11,13, 15, 16, 20-22, 24 and 28-31 stand rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,771,110 to Hirano et. al.

(Hirano) in view of U.S. Patent No. 6,133,145 to Chen, and claims 10, 17-19 and 25-27 stand rejected over Hirano and Chen as applied to claims 1, 7, 22 and 30 in view of U.S. Patent No. 5,968,847 to Ye et al. (Ye), and claims 3, 4, 14 and 23 stand rejected over Hirano and Chen and further in view of Muraguchi. These rejections are respectfully traversed.

Independent claim 1 has been amended to recite a combination of steps in a method of manufacturing a liquid crystal display device, including treating the exposed portion of said metal layer with a first plasma, prior to any step of etching said photoresist pattern, and prior to any step of etching said metal layer, to lower an internal binding force in the exposed portion of said metal layer to increase a subsequent etch rate of said metal layer, and etching the treated portion of said metal layer to form a pixel electrode, wherein said depositing a metal layer on the passivation layer, forming a photoresist pattern, and treating the exposed portion of said metal layer are sequentially performed.

Independent claim 22 has been amended to recite a combination of steps in a method of patterning a metal layer, including exposing the uncovered portion of said metal layer to a first plasma, prior to any step of etching said metal layer, to lower an internal binding force in the uncovered portion to increase a subsequent etch rate of said metal layer, and etching the uncovered portion of said metal layer with a second plasma to form a metal pattern, wherein said depositing a metal layer over a substrate, forming a mask

on a surface of the metal layer, and exposing the uncovered portion of said metal layer are sequentially performed.

Independent claim 30 has been amended to recite a combination of steps in a method of manufacturing a pixel electrode in a liquid crystal display device, including exposing the uncovered portion of said metal layer to at least one first gas, prior to any step of etching said photoresist pattern and prior to any step of etching said metal layer, to lower an internal binding force in the uncovered portion to increase a subsequent etch rate of said metal layer, and etching the uncovered portion of said metal layer with at least one second gas to form a pixel electrode, wherein said depositing a metal layer on the passivation layer, forming a photoresist pattern, and exposing the uncovered portion of said metal layer are sequentially performed.

Independent claim 31 has been amended to recite a combination of steps in a method of manufacturing a pixel electrode in a liquid crystal display device, including exposing the uncovered portion of said metal layer to at least one first gas, prior to any step of etching, to lower an internal binding force in the uncovered portion to increase a subsequent etch rate of said metal layer, and etching the uncovered portion of said metal layer with at least one second gas to form a pixel electrode, wherein said depositing a metal layer on the passivation layer, forming a photoresist pattern, and exposing the uncovered portion of said metal layer are sequentially performed.

Applicant respectfully submits that these combinations of steps as recited in independent claims 1, 22, 30 and 31 are not disclosed or fairly suggested by the prior art of record, including Hirano and Chen.

The Examiner has admitted that the method of Hirano does not teach or suggest certain features of the Applicant's claimed invention, and relies on Chen to supply the deficiencies. The Applicant respectfully submits that Chen cannot supply the deficiencies of Hirano.

With regard to independent claims 1, 22, 30 and 31, the Examiner asserts that (1) "to lower a binding force in the exposed portion of the metal layer" is an intended use recitation that does not define a manipulative difference between the combinations of Hirano and Chen, and (2) that lowering an internal binding force in the exposed portion of the metal layer to increase a subsequent etch rate of the metal layer is a necessary result of using the plasma treatment of Chen in the method of Hirano. Throughout the course of prosecution of this case, the Examiner's position has consistently been that the method of Chen "inherently" lowers a binding force in the exposed portion of the metal layer.

In addressing point (1), above, independent claims 1, 22, 30 and 31 have been amended to recite "lowering" in place of "to lower" thereby eliminating the Examiner's asserted "intended use" recitation. With

respect to point (2), the Examiner has maintained "the same process will yield the same results" and has placed the burden upon the Applicant to explain why the Applicant's claimed method achieves a result which is clearly contrary to the result achieved in Chen (unexpected results).

Unexpected Results

It is well settled law that the presence of a property not possessed by the prior art is evidence of nonobviousness. In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963). Further, it is well settled law that the absence of property which a claimed invention would have been expected to possess based on the teachings of the prior art is evidence of unobviousness. Ex parte Mead Johnson & Co. 227 USPQ 78 (Bd. Pat. App. & Inter. 1985).

If the Applicant's claimed method and the Hirano/Chen combination are (for the sake of argument) found to be the same, then it is clear that the result achieved by the Applicant's claimed invention are unexpected. For example, it is clear that in the method of Chen, the etch rate of the metal layer is maintained. Such a goal was set by Chen, and such a goal was achieved by Chen. Applicant's previous arguments with respect to this point are incorporated herein by reference thereto.

By contrast, in the Applicant's claimed method, the etch rate of the metal layer is not maintained, but rather, it is increased. One of ordinary skill in the art, reading Hirano in view of Chen, would not expect such a result. Therefore, based on the assumption (*in arguendo*) that the methods are the same, then the Applicant has obtained an unexpected result, and these rejections should be withdrawn.

Sequential Steps

The Applicant's claims have been amended to set forth a sequence of steps beginning with a step of depositing a metal layer on the passivation layer. In the Applicant's claimed invention, between the depositing a metal layer step and the claimed etching step, the exposed portion of the metal layer is treated with a first plasma (lowering a binding force in the exposed metal portion), and then a step of etching is performed.

In a first embodiment, Chen appears to teach steps of depositing a metal layer and a step of forming a photoresist pattern in Col.3, lines 1-28. In Chen, an RIE procedure is performed after steps of depositing a metal layer and forming a photoresist pattern (Chen, Col.3, lines 29-43). In this first embodiment of the method of Chen, no plasma pretreatment is performed.

In a second embodiment of Chen, the steps of depositing a metal layer and forming a photoresist pattern are again performed (Chen, Col.4, lines 1-

10). In other words, the depositing a metal layer and forming a photoresist pattern steps are identical to those of the first embodiment (Chen, Col.4, lines 8-9).

The next steps in the second embodiment of Chen define a key difference between the method of Chen and the method of the Applicant's claimed invention. That is, in Chen, both the photoresist pattern and the metal layer are exposed to a plasma treatment twice before the final etch cycle. The first exposure is discussed in Chen, Col.4, lines 10-12. The second exposure is discussed in Col.3, lines 16-18. The final or main etch cycle is discussed in Chen, Col.4, lines 25-29.

Based on this sequence of Chen, it is apparent that the Applicant's claimed method and the method of Chen are not the same. That is, in Chen, the photoresist pattern and the metal layer are exposed to a plasma twice before the final etch cycle. This could very well account for the opposite results obtained by the Applicant. At any rate, it is clear that the Applicant's claimed invention is patentably distinct from the invention of Chen, either by virtue of a distinction in the sequence of steps, or by virtue of a result obtained by the Applicant, which would clearly be unexpected when reading Hirano in view of Chen.

Applicant therefore respectfully submits that the combinations of elements as set forth in independent claims 1, 22, 30 and 31 are not disclosed or made obvious by the prior art of record, including Hirano and Chen, for the reasons explained above. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

Claims 2, 5-9, 11, 13, 15, 16, 20, 21, 24, 28 and 29 depend, either directly or indirectly, on claims 1, 22 and 30. Since neither Hirano, nor Chen, discloses or suggest the features of independent claims 1, 22, 30 and 31, Hirano, in view of Chen, cannot render claims 1, 2, 5-9, 11, 13, 15, 16, 20-22, 24 and 28-31 obvious to one of ordinary skill in the art.

Claims 3, 4, 10, 14, 17-19, 23 and 25-27, also depend on claims 1, 22, and 30. Since neither Hirano, nor Chen, nor Ye, nor Muraguchi discloses or suggests the features of independent claims 1, 22, and 30, Hirano and Chen, in view of Ye, or Hirano and Chen in view of Muraguchi cannot render claims 3, 4, 10, 14, 17-19, 23 and 25-27 obvious to one of ordinary skill in the art.

Reconsideration and withdrawal of these art grounds of rejection are respectfully requested.

Conclusion

Applicant considers all of the Examiner's comments to have been addressed and all of the Examiner's rejections overcome, thereby placing all

claims pending in the present Application in condition for allowance.

Accordingly, a Notice of Allowability is solicited in earnest.

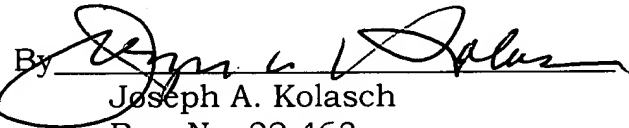
In the event that any outstanding matters remain in this application, Applicant requests that the Examiner contact Percy L. Square (Reg. No. 51,084) at (703) 205-8034 to discuss such matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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